

Star Dust

National Capital Astronomers, Inc.

Phone: 301/565-3709

Volume 56, Number 6

February, 1998

ISSN 0898-7548

Predicting and Chasing Solar Eclipses

by Wayne Warren

The next meeting of the National Capital Astronomers will be held Saturday, February 7, at 7:30 P.M. in the Lipsett Auditorium of the Clinical Center (Building 10) at the National Institutes of Health (NIH). Our speaker, Fred Espenak, will be talking about "Predicting and Chasing Solar Eclipses."

Abstract

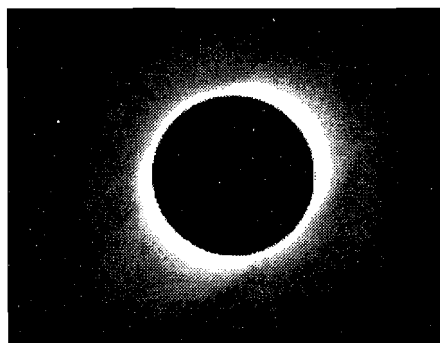
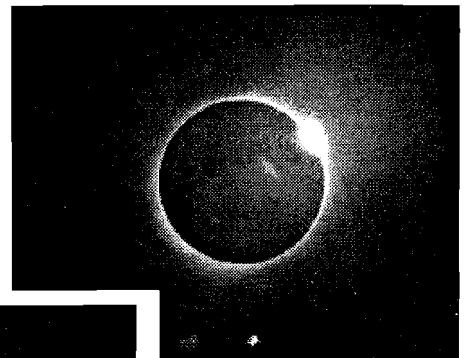
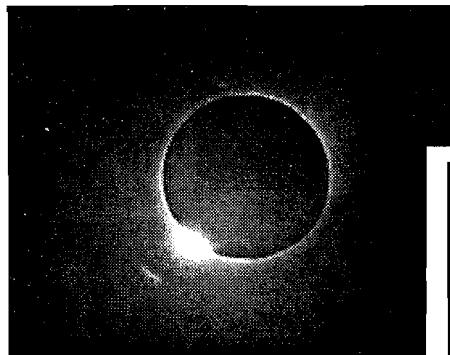
The total eclipse of the Sun is indisputably the most spectacular astronomical phenomenon visible to the naked eye. As such, it commands a great deal of attention from both astronomers and the general public. Dr. Espenak has been predicting and chasing solar eclipses around the world for more than two decades. He will discuss the NASA eclipse bulletins, future eclipses in 1998 and 1999, and he will share some of his eclipse adventures through slides and video, including his recent expedition to Mongolia in March 1997.

Biography

Dr. Fred Espenak is an astrophysicist in the Planetary Systems Branch at NASA Goddard Space Flight Center. His re-

search specialty is infrared spectroscopy and modeling of planetary atmospheres. However, Dr. Espenak is also an authority on the prediction of solar eclipses. Since his first total solar eclipse in 1970, he has participated in more than a dozen eclipse expeditions and has made predictions on thousands of others. In 1993, Dr. Espenak introduced a new series of NASA publications containing detailed predictions, maps, and meteorological data for fu-

ture solar eclipses. These Bulletins had previously been published by the US Naval Observatory. Now published through NASA in cooperation with the International Astronomical Union, the eclipse bulletins are provided as a public service to both the professional and lay communities, including educators and media. The latest bulletins in the series cover eclipses of Feb 26, 1998 and Aug 11, 1999. Both are available via the Web at: <http://umbra.nascom.nasa.gov/eclipse/>. Dr. Espenak has also created a web site dedicated to both solar and lunar eclipses at: <http://planets.gsfc.nasa.gov/eclipse/eclipse.html> ○



The three photographs of the total solar eclipse of Oct 24, 1995 were taken by Fred Espenak of NASA Goddard Space Flight Center from the small town of Dundlord, India. The eclipse was unique for its low altitude (23°) and short duration (40 seconds), due to the fact that the Moon was only 1.1% larger than the Sun. As a result, the limbs of the Sun and Moon were in close proximity to each other over a rather long arc at second and third contacts.

Calendar of Monthly Events

The Public is Welcome!

NCA Home Page: <http://myhouse.com/NCA/home.htm>

Mondays, February 2, 9, 16, and 23, 7:30 PM- Public nights at U.S. Naval Observatory (USNO), in Northwest Washington, D.C. (off Massachusetts Avenue). Includes orientation on USNO's mission, viewing of operating atomic clocks, and glimpses through the finest optical telescopes in the Washington-Baltimore region. Held regardless of cloud cover. Information: USNO Public Affairs Office, 202/762-1438. Home page: <http://www.usno.navy.mil>.

Tuesdays, February 3, 10, 17, and 24, 7:30 PM- Telescope making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 202/362-8872.

Fridays, February 6, 13, 20, and 27, 7:30 PM- Telescope making classes at American University, McKinley Hall Basement. Information: Jerry Schnall, 202/362-8872.

Fridays, February 6, 20, and 27, 8:30 PM- Open nights with NCA's Celestron-14 telescope at Ridgeview Observatory; near Alexandria, Virginia; 6007 Ridgeview Drive (off Franconia Road between Telegraph Road and Rose Hill Drive). Information: Bob Bolster, 703/960-9126. Call before 6:00 PM.

Saturday, February 7, 5:30 PM- Dinner with the speaker and other NCA members at the Bombay Dining Indian Restaurant, 4931 Cordell Avenue, Bethesda, MD. See map and directions on back page.

Saturday, February 7, 7:30 PM- NCA meeting, will feature Fred Espenak of Planetary Systems Branch of NASA Goddard Space Flight Center, speaking on "Predicting and Chasing Solar Eclipses." For directions, see map and directions on back page.

During questionable weather, call the IOTA Hotline (Phone: 301/474-4945) for NCA meeting status. The absence of a cancellation notice on the Hotline means the meeting will take place.

See page 4 for more Washington area astronomical events. Other events too numerous to list in *Star Dust* are listed in the publications, *Sky & Telescope*, the *Astronomical Calendar 1997*, the *Observer's Handbook 1997*, in numerous software packages, and other links available on the NCA Home Page (see above for address). NCA members can purchase all these (and much more) at a discount. To join NCA, use membership application on page 5.

Sun Protection in Curaçao

By Leith Holloway

Because the solar eclipse occurs in February, participants on the NCA trip may think that there is little risk of getting sunburned in Curaçao. That is far from the truth! On the day of the total eclipse, the sun above Curaçao reaches a maximum altitude of 69 degrees at 12:50 p.m. AST (Atlantic Standard Time), which is about the time of first contact. On the other hand, at our latitude, the sun reaches this altitude sometime during the day only between May 11th and August 1st.

The closer the sun is to the zenith, the stronger are its ultraviolet (UV) rays. Furthermore, the ultraviolet-absorbing

ozone layer in the stratosphere is significantly thinner in the tropics than in middle latitudes where we live. The latitude of Curaçao is 12 degrees north of the Equator. As a result of this low latitude, sunburning UV rays can be up to fifty percent stronger in Curaçao than in Washington, D.C.

It is not difficult to protect your skin from sunburn and other damage even in the tropics, but one has to be more conscientious about sun protection at these low latitudes. On a sunny day, a person should cover as much of his skin with clothing or SPF 15 sunscreen as practical. The clothing should be made of

tightly woven material. A hat with a broad brim is preferable, but any hat is better than none.

Another consideration is the kind of skin you have. Some people, such as persons with red or blond hair, blue eyes and/or freckles are more sensitive to UV rays than others. They have to be especially careful in the sun.

Fortunately, the period of dangerous UV does not last the whole day. Early in the morning or late in the afternoon, UV from the sun and sky is rather weak and incapable of burning you. In the tropics, however, the period of dangerous UV is somewhat longer than at our latitudes.

During the total phase of the eclipse, of course, UV intensities will be negligible.

Solar radiation is strongest and most likely to burn you when the sun is 45 degrees or more above the horizon, or in other words, more than halfway between the horizon and the zenith. A simple method for finding out when this occurs during the day is to look at your shadow on a level surface. If your shadow is shorter than your height, the sun's altitude is above 45 degrees, and its UV rays are strongest. This method is called "the shadow rule." You may have heard Bob Ryan mention this rule on his weather broadcasts on WRC-TV during the summer. I invented this rule in 1987 and have been promoting it ever since then in published articles and letters to editors.

As a guide for your outdoor planning, the sun in Curaçao will be above 45 degrees altitude between about 10:10 a.m. and 3:30 p.m. during our visit there in late February. Because of the great strength of solar UV in Curaçao, it would be prudent to take steps for protecting your skin about a half hour before the start of this period (9:40 a.m.) and continue doing this until 4 p.m. ○

Holiday Delays Newsletter

By Alisa Joaquin

December and November were not banner months for the newsletter. Some people reported to me that they did not receive their newsletter until the day of the meeting or later. There is a reason why the deadline is set for the 15th of each month. This is so the newsletter can be done within a reasonable framework and then be mailed by the last Sunday of each month giving one full week for members to receive it. This is how it would normally be done. With the holiday season, however, the newsletter must be mailed early to ensure proper delivery. But with the combined effects of material being late and your editor's previous announced travel plans, that did not happen.

We always strive to get your newsletter to you on time. During the holiday we mailed the newsletter using our usual schedule. We regret the inconvenience if your newsletter was late. We expressed our need that we would be out of town and we needed to mail the newsletter early **before** we were leaving. That did not happen.

The March newsletter will present a similar situation as your editors will be in Curaçao from February 20-27. Therefore, no material can be accepted for publication **after** February 15. We need your help in this matter, not only for the March newsletter, but for all future newsletters. Let's work together and keep everything on track. ○

**The January Review was unavailable at press time.
The review will appear in a later issue of *Star Dust*.**

Special Newsletter Deadline for *March Star Dust*, February 10, 1998

Send Submissions to Alisa & Gary Joaquin, at 4910 Schuyler Dr., Annandale, VA, 22003-5144. Leave a message on voice mail 703/750-1636. Text files or graphic files in .GIF or .TIFF may be sent via E-Mail to ajglj@erols.com or fax submissions to 703/658-2233.

No submissions will be accepted after the 15th. This is a special condition. Since we will be in Curaçao from February 20-27, we need to mail the newsletter by the 19th. The deadline will return to its normal date in March. We would appreciate everyone's help in this matter. Thank you.

See you in Curaçao!!

Stellar Imagery Part 1

by Gary L Joaquin

A couple of years ago I wrote the following about what astronomy means to me. I've modified it slightly to speak more directly to an NCA audience:

During my reflections of the last week I was surprised to see how deeply astronomy resonates within me. Tonight I will share with you some of the images that I value deeply. I hope that they speak to you as much as they speak to me:

- Lying huddled together with my wife, Alisa, in our sleeping bag at Sky Meadow State Park... We awake from a brief sleep. The stars have moved... The earth did not stop turning as we slept... The sun has completely set now and the sky is velvety black... The stars seem much closer... A sense of anticipation builds... There is no better way to awake...
- Observing the moons of Jupiter with a pair of binoculars on consecutive evenings with Alisa who exclaims, "The moons are in different positions tonight!"... to which I reply with my infallible wisdom, "That's impossible. They can't move that fast." But she insists, "They have moved!" Later I looked up the orbits and discovered, "Yes, they can move that fast". From that point on even if Earth's moon is not in sight, there is no longer any such thing as a moonless night for the two of us.
- Working on *Starwalks*, the astronomy newsletter that the two of us created ... It has long ceased to be Friday night... It's well after 3 am... I'm still energized by the story that is unfolding on my computer screen. With each passing moment I acquire one more landmark as I make my way around this virtual sky. A tingle runs up my spine as I learn yet another story from ancient and modern minds about our celestial globe... I am building a map that will last a lifetime...

Part 2 will appear in a later issue.

National Capital Area Astronomical Events

Free Lectures at the Einstein Planetarium and Other Daily Events
National Air & Space Museum

202/357-1550, 202/357-1686, or 202/357-1505 (TTY)

Home page: <http://www.nasm.edu>

Other Area Astronomical Events

Other Planetariums, Observatories, and Science Centers in the Area

Montgomery College Planetarium — “African Skies”
Takoma Park, MD. February 21,
7:00 PM. (See their web site at <http://myhouse.com/mc/planet.htm>.)

Department of Terrestrial Magnetism Seminar Schedule —
Seminars are held on Wednesdays at
11:00 am unless otherwise notes.
Call to confirm 202/686-4370 ext.
4378.

“To Be Announced”, speaker: Scott
Messenger, National Institute for
Standards and Technology. February
4.

“Life on Mars: The Good News and
the Bad News from Stable Isotopic
Studies of Martian Meteorites”,
speaker: Laurie Leshin, University
of California. February 11.

“How Do Stars Form? Some New
Insights”, speaker: Pedro N. Safier,
Department of Astronomy, University
of Maryland. February 18.

**Scientific Colloquia, Goddard
Space Flight Center** — All colloquia
will be held in the Building 3
Auditorium at 3:30 PM.

“Asteroids”, speaker: Clark
Chapman, Southwest Research Institute.
February 6.

“Return to the Moon”, speaker:
Harrison Schmitt, University of
Wisconsin. February 20.

“Hubble Constant: the End Game”,
speaker: John Huchra, Harvard
University. February 27.

**Campus Observatory Open
House University of Maryland** —
“Imaging Solar Flare Gamma
Rays — How NASA Plans to do It”,
speaker: Dr. Ed Schmah. February
5, 8:00 PM.

“X-Ray Pulsars, Timekeepers of the
Cosmos”, speaker: Dr. Mike Stark.
February 20, 8:00 PM.

Arlington Schools Planetarium —
“The Lighthearted Astronomer”.
January 22-March 8, Friday and
Saturday evenings 7:30 and Sunday
matinees 1:30 and 3:00 PM. Admission
\$2.50 for adults and \$1.50 for
children. Call 703/228-6070 or 228-
6019.

**Capital Science Lectures
Carnegie Institution** — “Exploring
the Giant Planets with the
Hubble Space Telescope”, speaker:
Heidi B. Hammel, Department of
Earth Atmospheric and Planetary
Sciences, MIT. January 20, 6:30
PM.

Check your local web sites for any
other events that may be happening
in the area.

Smithsonian Events in February

**National Museum of American
History** — “Lasers and
Electromobiles”, Innovative Lives
Video, featuring Hal Walker. He
discusses his role in the use of lasers
to measure the distance between
Earth and the Moon. February 4,
11:30 AM, and February 7, 1:30
PM.

National Air & Space Museum —
“George Carruthers’ Lunar Observatory”,
speaker: David DeVorkin
talks about George Carruthers and
his contributions to the space program.
February 18, 12:00 NOON.

Ripley Center — “The Hubble
Space Telescope: Current Discoveries”,
speaker: Astrophysicist
Mario Livio in this 1 day seminar
discusses the latest discoveries
made by two new instruments on the
Hubble Space Telescope. Cost \$80,
February 28, 10:00 AM-4:30 PM
(lunch not included).

Astronomy at Claggett

*I received this email from
Donna Kerner, Bishop
Claggett Center—ed.*

Thanks so much for advertising
our need for an astronomy expert
at the Bishop Claggett Center.
Jay Miller responded and did a
terrific job!! He came on New
Year’s Eve and many children,
youth, and adults looked through
his telescope. He was very pleasant,
knowledgeable, and a good sport
braving the cold. I plan to contact
him and you for plans for our
summer youth programs. We really
appreciate Jay donating time to
our programs here. Thanks for your
help. . . Happy New Year!!.

No Meteor Showers listed for February

Watch this site for more information on upcoming meteor shower events.

National Capital Astronomers, Inc.

SERVING SCIENCE & SOCIETY SINCE 1937

NCA is a non-profit, membership supported, volunteer run, public-service corporation dedicated to advancing space technology, astronomy, and related sciences through information, participation, and inspiration, via research, lectures, presentations, publications, expeditions, tours, public interpretation, and education. NCA is the astronomy affiliate of the Washington Academy of Sciences. All are welcome to join NCA.

SERVICES & ACTIVITIES:

Monthly Meetings feature presentations of current work by researchers at the horizons of their fields. All are welcome; there is no charge. See monthly *Star Dust* for time and location.

NCA Volunteers serve as skilled observers frequently deploying to many parts of the National Capital region, and beyond, on campaigns and expeditions collecting vital scientific data for astronomy and related sciences. They also serve locally by assisting with scientific conferences, judging science fairs, and interpreting astronomy and related subjects during public programs.

Discussion Groups exchange information, ideas, and questions on preselected topics, moderated by an NCA member or guest expert.

Publications received by members include the monthly newsletter of NCA, *Star Dust*, and an optional discount subscription to *Sky & Telescope* magazine.

NCA Information Service answers a wide variety of inquiries about space technology, astronomy, and related subjects from the public, the media, and other organizations.

Consumer Clinics on selection, use, and care of binoculars and telescopes, provide myth-breaking information, guidance, and demonstrations for those contemplating acquiring their first astronomical instrument.

Dark-Sky Protection Efforts educate society at large about the serious environmental threat of light pollution, plus seek ways and means of light pollution avoidance and abatement. NCA is an organizational member of the International Dark-Sky Association (IDA), and the National Capital region's IDA representative.

Classes teach about subjects ranging from basic astronomy to hand-making a fine astronomical telescope. NCA's instructors also train educators in how to better teach astronomy and related subjects.

Tours travel to dark-sky sites, observatories, laboratories, museums, and other points of interest around the National Capital region, the Nation, and the World.

Discounts are available to members on many publications, products, and services, including *Sky & Telescope* magazine.

Public Sky Viewing Programs are offered jointly with the National Park Service, the Smithsonian Institution, the U.S. Naval Observatory, and others.

NCA Juniors Program fosters children's and young adults' interest in space technology, astronomy, and related sciences through discounted memberships, mentorship from dedicated members, and NCA's annual Science Fair Awards.

Fine Quality Telescopes up to 36-cm (14-inch) aperture are available free for member's use. NCA also has access to several relatively dark-sky sites in Maryland, Virginia, and West Virginia.

YES! I'D LIKE TO JOIN THE NATIONAL CAPITAL ASTRONOMERS

Enclosed is my payment for the following membership category:

☐ Regular

☐ *Sky & Telescope* and *Star Dust*. (\$54 per year)

☐ *Star Dust* only (\$27 per year)

☐ Junior (Only open to those under age 18) Date of birth: _____

Junior members pay a reduced rate.

☐ *Sky & Telescope* and *Star Dust*. (\$42 per year)

☐ *Star Dust* only (\$15 per year)

First name

Middle

Last name

(____)_____
Telephone

Street or Box

Apartment

City

State

Zip Code + 4

If family membership, list names of additional participating immediate family members in same household, with birthdates of all those under 18 years old: _____

Note: If you already subscribe to *Sky & Telescope*, please attach a recent mailing label. You may renew this subscription through NCA for \$27 when it expires.

Make check payable to: **National Capital Astronomers, Inc.**, and send with this form to:

NCA c/o Jeffrey B. Norman, 5410 Connecticut Avenue, NW, Apt. #717, Washington, D.C. 20015-2837.

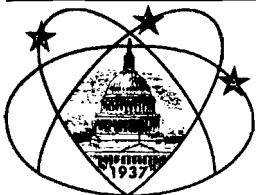
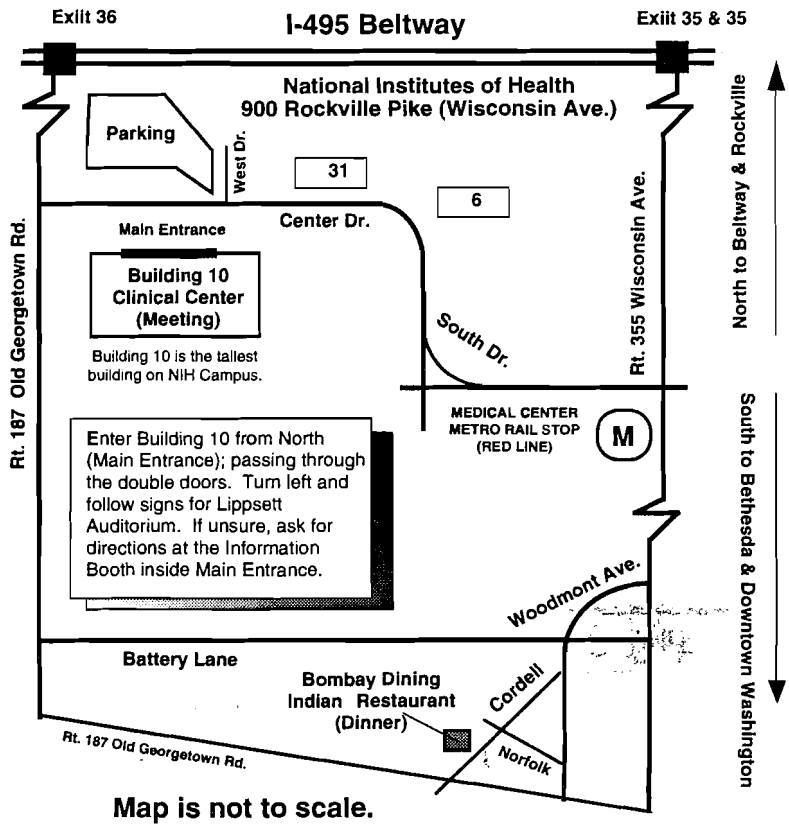
The following information is optional. Please indicate briefly any special interests, skills, education, experience, or other resources which you might contribute to NCA. **Thank you, and welcome to NCA!**

Getting to the NCA Monthly Meeting

Metrorail Riders - From Medical Center Metro Station: Walk down the hill, pass the bus stops and turn right at the anchor onto Center Drive. Continue uphill to Building 10, the tallest building on campus (walking time about 10 minutes). Also, the J2 bus line connects the Bethesda (7:16 PM) and NIH (7:23 PM) Metro stops with Building 10 (7:25 PM).

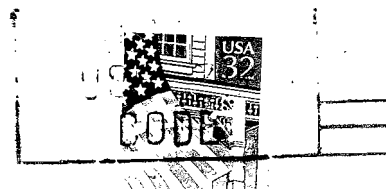
To Bombay Dining Indian Restaurant- Take Wisconsin Avenue toward Bethesda and head right onto Woodmont. Follow Woodmont to Cordell Avenue (2 blocks south of Battery). The Bombay Dining Indian Restaurant is not far from the corner of Cordell Avenue and Norfolk (4931 Cordell Avenue). There are parking garages near the restaurant. Seats are not guaranteed after 5:00 PM.

Star Dust is published ten times yearly (September through June) by the National Capital Astronomers, Inc. (NCA), a nonprofit, astronomical organization serving the entire National Capital region, and beyond. NCA is the astronomy affiliate of the Washington Academy of Sciences and the National Capital region's representative of the International Dark-Sky Association. NCA's Phone Number 03/841-4765. President: Harold Williams, 301/565-3709. Deadline for *Star Dust* is the 15th of the preceding month. Editors: Alisa & Gary Joaquin, 4910 Schuyler Dr., Annandale, VA 22003, 703/750-1636, E-mail: ajglj@erols.com. Editorial Advisor: Nancy Byrd *Star Dust* © 1997 may be reproduced with credit to National Capital Astronomers, Inc.



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10500 Rockville Pike
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DATED MATERIAL

7/98
Leith Holloway Apt M10
10500 Rockville Pike
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February 1998